

# BEST AVAILABLE COPY

CS02-012

Application no. 10/633,131

## Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

## Listing of Claims:

Claim 1 (previously presented): A slurry dispensing apparatus for use with a chemical mechanical polishing tool for planarizing semiconductor substrates having irregular topology, said apparatus comprising:

a slurry dispensing manifold having a first end suspended over a polishing pad, and a second end for mounting to the chemical mechanical polishing tool;

a linear array of slurry dispensing nozzles positioned under said suspended manifold, wherein each nozzle is fed from a bifurcated supply line, and each branch of said bifurcated supply line having an adjustable flow control valve, a flow meter and a check valve.

Claim 2 (previously presented): The apparatus of claim 1 wherein said bifurcated supply line conjoined to each nozzle provides an adjusted volume of slurry from one branch and an adjusted volume of liquid from the other branch.

Claim 3 (previously presented): The apparatus of claim 1 wherein said adjusted volume of slurry and adjusted volume of liquid provides the means for diluting the dispensed slurry to selected

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nozzles thereby controlling the polishing rate in specific zones on a substrate according to its topography.

Claim 4 (original): The apparatus of claim 1 wherein each of said array of nozzles are identical.

Claim 5 (previously presented): The apparatus of claim 1 wherein said slurry and liquid that is supplied to each branch of said bifurcated supply lines are fed from a source container, serially, through a variable flow control valve, a flow meter, and a check valve.

Claim 6 (original): The apparatus of claim 5 wherein said variable flow control valve is slaved to an output signal provided by said flow meter in response to a programmable tool controller.

Claim 7 (original): The apparatus of claim 5 wherein said check valves mounted proximal junction of said bifurcated supply lines performs as a mixing venturi for said nozzles.

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Claim 8 (previously presented): The apparatus of claim 5 wherein said slurry is a colloidal alumina or silica prepared with deionized water, and said liquid is deionized water used for diluting said slurry.

Claim 9 (original) The apparatus of claim 1 wherein said polishing is accomplished in two steps:  
a)adjusting nozzle dispense volume according to substrate topology;  
b)allowing full flow for finishing polishing uniformity.

Claims 10-18 (cancelled)

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Claim 19. (original): A method for planarizing semiconductor substrates having irregular topology, comprising the steps of:

providing a chemical mechanical polishing tool;

providing a slurry dispensing manifold having a first end suspended over a

polishing pad, and a second end for mounting to the chemical mechanical polishing tool;

providing a linear array of slurry dispensing nozzles positioned under said

suspended manifold, each nozzle of said linear array dispensing an adjusted slurry

mixture supplied from a bifurcated supply line, while each branch of said bifurcated supply line having an adjustable flow control valve, a flow meter, and a check valve.

Claim 20 (previously presented): The method of claim 19 wherein said bifurcated supply lines dispense an adjusted volume of slurry and an adjusted volume of a liquid to each nozzle.

Claim 21 (previously presented): The method of claim 19 wherein said adjusted volume of slurry and adjusted volume of a liquid provide the means for diluting the dispensed slurry through selected nozzles thereby fine-tuning the polishing rate on a substrate according to its topography.

Claim 22 (original): The method of claim 19 wherein each of said array of nozzles are identical.

Claim 23 (previously presented): The method of claim 19 wherein said slurry and liquid that is supplied to each branch of said bifurcated supply lines are fed, serially, from a source container, to a variable flow control valve, a flow meter, a check valve, a junction, and said nozzle.

Claim 24 (original): The method of claim 23 wherein said variable flow control valve is slaved to an output signal provided by said flow meter in response to a programmable tool controller.

Claim 25 (previously presented): The method of claim 23 wherein said check valves mounted proximal said junction of said bifurcated supply lines performs as a mixing venturi for said nozzles.

Claim 26 (previously presented): The method of claim 23 wherein said slurry is a colloidal alumina or silica in deionized water, and said liquid is deionized water used for dilution.

Claim 27 (previously presented): The method of claim 19 wherein said polishing is accomplished in two steps.

- i. adjusting the dilution of slurry to each nozzle according to substrate topology;
- ii. normalize flow to each nozzle for polishing uniformity.

28. (new) A chemical mechanical polishing apparatus for planarizing semiconductor substrates having irregular topology, the apparatus comprising:

a polishing head assembly for holding a substrate therein and for rotating said substrate while in polishing contact with said polishing pad;

a polishing table for supporting and rotating a polishing pad thereon;

a dressing table for oscillating against the top surface of the polishing pad to restore the texture of the polishing pad; and

a slurry dispensing apparatus according to claim 1.

29. (new) A chemical mechanical polishing apparatus according to claim 28, wherein said bifurcated supply line conjoined to each nozzle provides an adjusted volume of slurry from one branch and an adjusted volume of liquid from the other branch.

30. (new) A chemical mechanical polishing apparatus according to claim 28, wherein said adjusted volume of slurry and adjusted volume of liquid provides the means for diluting the dispensed slurry to selected nozzles thereby controlling the polishing rate in specific zones of on a substrate according to its topology.

31. (new) A chemical mechanical polishing apparatus according to claim 28, wherein each of said array of nozzles are identical.

32. (new) A chemical mechanical polishing apparatus according to claim 28, wherein said slurry and liquid that is supplied to each branch of said bifurcated supply lines are fed from a source container, serially, through a variable flow control valve, a flow meter, and a check valve.

33. (new) A chemical mechanical polishing apparatus according to claim 32, wherein said variable control valve is slaved to an output signal provided by said flow meter in response to a programmable tool controller.

34. (new) A chemical mechanical polishing apparatus according to claim 32, wherein said check valves mounted proximal junction of said bifurcated supply lines performs as a mixing venture for said nozzles.

35. (new) A chemical mechanical polishing apparatus according to claim 32, wherein said slurry is a colloidal alumina or silica prepared in deionized water, and said liquid is deionized water used for diluting said slurry.